



Sequence Listing 1998-407-FF-SQ
SEQUENCE LISTING

(1) GENERAL INFORMATION:

(i) APPLICANT:

(A) NAME: Akzo Nobel N.V.
(B) STREET: Velperweg 76
(C) CITY: Arnhem
(E) COUNTRY: The Netherlands
(F) POSTAL CODE (ZIP): 6824 BM
(G) TELEPHONE: 0412 666379
(H) TELEFAX: 0412 650592

(ii) TITLE OF INVENTION: Coccidiosis vaccines

(iii) NUMBER OF SEQUENCES: 41

(iv) COMPUTER READABLE FORM:

(A) MEDIUM TYPE: Floppy disk
(B) COMPUTER: IBM PC compatible
(C) OPERATING SYSTEM: PC-DOS/MS-DOS
(D) SOFTWARE: PatentIn Release #1.0, Version #1.30 (EPO)

(2) INFORMATION FOR SEQ ID NO: 1:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 214 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: Linear

(ii) MOLECULE TYPE: protein

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

Met Pro Phe Glu Leu Pro Pro Leu Pro Tyr Pro Met Asp Ala Leu Glu
1 5 10 15

Pro Tyr Ile Ser Lys Glu Thr Leu Glu Tyr His Tyr Gly Lys His His
20 25 30

Ala Ala Tyr Val Asn Asn Leu Asn Arg Leu Val Glu Gly Lys Pro Glu
35 40 45

Ala Ser Lys Ser Leu Glu Glu Ile Ile Lys Thr Ser Ser Gly Ser Val
50 55 60

Leu Asn Asn Ala Gly Gln Ala Trp Asn His Thr Phe Tyr Trp Lys Ser
65 70 75 80

Met Arg Pro Ala Ser Ala Gly Gly Pro Pro Gly Ala Pro Gly Gly Gly
85 90 95

Pro Pro Gly Ala Pro Gly Ala Pro Leu Arg Glu Glu Leu Glu Ser Ala
100 105 110

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Phe Gly Val Glu Lys Phe Arg Glu Ala Phe Ala Ala Ala Ala
115 120 125

Ala His Phe Gly Ser Gly Trp Ala Trp Leu Cys Phe Cys Lys Lys Ser
130 135 140

Arg Ser Leu Phe Leu Leu Gln Thr His Asp Gly Ala Thr Pro Phe Arg
145 150 155 160

Asp Asn Pro Asn Cys Ala Pro Leu Leu Thr Cys Asp Leu Trp Glu His
165 170 175

Ala Tyr Tyr Ile Asp Arg Arg Asn Asp Arg Lys Ser Tyr Leu Asp Ala
180 185 190

Trp Trp Ser Val Val Asn Trp Asp Phe Ala Asn Glu Asn Leu Lys Lys
195 200 205

Ala Met Gln Gly Ser Asp
210

(2) INFORMATION FOR SEQ ID NO: 2:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 13 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: protein
- (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2:

Leu Gly Pro Leu Ala Leu Pro Leu Leu Ala Asp Val Arg
1 5 10

(2) INFORMATION FOR SEQ ID NO: 3:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 223 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: protein
- (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:

Met Pro Leu Asn Leu Gly Asp Ser Phe Pro Asp Phe Gln Ala Glu Ala
1 5 10 15

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Leu Gly Ala Glu His Phe Arg Leu His Glu Tyr Leu Gly Asp Ser Trp
 20 25 30

Gly Val Met Phe Ser His Pro Asn Asp Phe Thr Pro Val Cys Thr Thr
 35 40 45

Glu Leu Ala Glu Ala Val Lys Leu Gln Asp Ser Phe Thr Lys Lys Asn
 50 55 60

Cys Lys Leu Val Gly Phe Ser Cys Asn Asp Leu Gln Ser His Arg Glu
 65 70 75 80

Trp Ala Lys Asp Ile Met Ala Tyr Ala Gly Arg Ser Gly Asn Leu Pro
 85 90 95

Phe Pro Leu Val Cys Asp Pro Asn Arg Glu Leu Ala Ala Ser Leu Gly
 100 105 110

Ile Met Asp Pro Ala Glu Lys Asp Lys Lys Gly Leu Pro Leu Thr Cys
 115 120 125

Arg Cys Val Phe Phe Ile Ser Pro Glu Lys Lys Leu Ala Ala Ser Ile
 130 135 140

Leu Tyr Pro Ala Thr Thr Gly Arg Asn Phe Ala Glu Ile Leu Arg Val
 145 150 155 160

Leu Asp Ser Leu Gln Leu Thr Ala Lys Phe Pro Val Ala Thr Pro Val
 165 170 175

Asp Trp Thr Ala Gly Ala Lys Cys Cys Val Val Pro Asn Leu Ala Ala
 180 185 190

Glu Glu Ala Gln Arg Leu Leu Pro Lys Gly His Glu Ala Leu Gln Leu
 195 200 205

Pro Ser Gly Lys Pro Tyr Leu Arg Leu Thr Pro Asp Pro Arg Gly
 210 215 220

(2) INFORMATION FOR SEQ ID NO: 4:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 15 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: protein
- (v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4:

Met Ser Pro Ser Pro Ala Gly Val Ala Glu Tyr Leu Ala Ser Leu
 1 5 10 15

(2) INFORMATION FOR SEQ ID NO: 5:

- (i) SEQUENCE CHARACTERISTICS:

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(A) LENGTH: 16 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5:

Asn His Ala Glu Phe Asp Pro Ser Gln Thr Glu Val Val Val Phe Pro
1 5 10 15

(2) INFORMATION FOR SEQ ID NO: 6:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 20 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(v) FRAGMENT TYPE: internal

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6:

Val Asp Ser Phe Thr Pro Ser Val Gly Cys Val Phe Ala Gly Met Pro
1 5 10 15

Ala Asp Phe Arg
20

(2) INFORMATION FOR SEQ ID NO: 7:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7:

GTAAATTGGG ACTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 8:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid

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(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8:

GTAAACTGGG ACTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 9:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9:

GTAAATTGGG ACTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 10:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10:

GTAAACTGGG ACTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 11:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11:

GTAAATTGGG ACTTCGC

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(2) INFORMATION FOR SEQ ID NO: 12:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12:

GTAACTGGG ACTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 13:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13:

GTAAATTGGG ACTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 14:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14:

GTAACTGGG ACTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 15:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15:

GTGAATTGGG ACTTTGC

17

(2) INFORMATION FOR SEQ ID NO: 16:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 16:

GTGAACTGGG ACTTTGC

17

(2) INFORMATION FOR SEQ ID NO: 17:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 17:

GTGAATTGGG ACTTTGC

17

(2) INFORMATION FOR SEQ ID NO: 18:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 18:

GTGAACTGGG ACTTTGC

17

(2) INFORMATION FOR SEQ ID NO: 19:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

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(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19:

GTCAATTGGG ACTTTGC

17

(2) INFORMATION FOR SEQ ID NO: 20:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20:

GTCAACTGGG ACTTTGC

17

(2) INFORMATION FOR SEQ ID NO: 21:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 21:

GTCAATTGGG ACTTTGC

17

(2) INFORMATION FOR SEQ ID NO: 22:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 22:

GTCAACTGGG ACTTTGC

17

(2) INFORMATION FOR SEQ ID NO: 23:

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(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 23:

GTAAATTGGG ATTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 24:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 24:

GTAAACTGGG ATTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 25:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 25:

GTAAATTGGG ATTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 26:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 26:

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GTAAACTGGG ATTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 27:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 27:

GTAAATTGGG ATTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 28:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 28:

GTAAACTGGG ATTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 29:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 29:

GTAAATTGGG ATTTCGC

17

(2) INFORMATION FOR SEQ ID NO: 30:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 30:

GTAACTGGG ATTCG

17

(2) INFORMATION FOR SEQ ID NO: 31:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 31:

GTGAATTGGG ATTTG

17

(2) INFORMATION FOR SEQ ID NO: 32:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 32:

GTAACTGGG ATTTG

17

(2) INFORMATION FOR SEQ ID NO: 33:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 33:

GTGAATTGGG ATTTG

17

(2) INFORMATION FOR SEQ ID NO: 34:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs

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(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 34:

GTGAACTGGG ATTTTGC

17

(2) INFORMATION FOR SEQ ID NO: 35:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 35:

GTCAATTGGG ATTTTGC

17

(2) INFORMATION FOR SEQ ID NO: 36:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 36:

GTCAACTGGG ATTTTGC

17

(2) INFORMATION FOR SEQ ID NO: 37:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 37:

GTCAATTGGG ATTTTGC

17

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(2) INFORMATION FOR SEQ ID NO: 38:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 38:

GTCAACTGGG ATTTTGC 17

(2) INFORMATION FOR SEQ ID NO: 39:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 719 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 39:

atg ccg ttc gaa ctc ccc ccc ccg ctg ccg tac ccc atg gac gcc ctc gag	48
Met Pro Phe Glu Leu Pro Pro Leu Pro Tyr Pro Met Asp Ala Leu Glu	
1 5 10 15	
ccg tac atc agc aaa gag act ctc gag tac cac tat ggg aag cac cac cac	96
Pro Tyr Ile Ser Lys Glu Thr Leu Glu Tyr His Tyr Gly Lys His His	
20 25 30	
gcg gct tac gtg aac aac ttg aac aga ctc gtc gag ggg aag ccg gag	144
Ala Ala Tyr Val Asn Asn Leu Asn Arg Leu Val Glu Gly Lys Pro Glu	
35 40 45	
gct tcc aag agc ctg gag gaa ata ata aag acc tcc tcg ggg tcg gtg	192
Ala Ser Lys Ser Leu Glu Glu Ile Ile Lys Thr Ser Ser Gly Ser Val	
50 55 60	
ctg aac aac gcg ggc cag gcg tgg aac cac acg ttc tac tgg aag tcg	240
Leu Asn Asn Ala Gly Gln Ala Trp Asn His Thr Phe Tyr Trp Lys Ser	
65 70 75 80	
atg cgg ccg gcc tcg gcg ggg ggc ccc ccc ccg ggg gcc ccc ggc ggg ggc	288
Met Arg Pro Ala Ser Ala Gly Gly Pro Pro Gly Ala Pro Gly Gly Gly	
85 90 95	
ccc ccg ggg gcc ccg ggg gcc ccc ctg cgg gag gag ctg gag agc gcg	336
Pro Pro Gly Ala Pro Gly Ala Pro Leu Arg Glu Glu Leu Glu Ser Ala	
100 105 110	
ttc ggg ggc gtg gag aag ttc cgg gag gcc ttt gct gct gct gct gct	384
Phe Gly Gly Val Glu Lys Phe Arg Glu Ala Phe Ala Ala Ala Ala Ala	

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115

120

125

432

gct cac ttc ggc tcg ggc tgg gcc tgg ctc tgc ttc tgc aag aag tcc
 Ala His Phe Gly Ser Gly Trp Ala Trp Leu Cys Phe Cys Lys Lys Ser
 130 135 140

480

cgc agc ctc ttt ttg ctg cag acc cac gac ggg gcc acg cct ttc aga
 Arg Ser Leu Phe Leu Leu Gln Thr His Asp Gly Ala Thr Pro Phe Arg
 145 150 155 160

528

gac aac ccc aac tgc gcg ccg ctg ctc acc tgc gac ctg tgg gag cac
 Asp Asn Pro Asn Cys Ala Pro Leu Leu Thr Cys Asp Leu Trp Glu His
 165 170 175

576

gcc tac tac atc gac cgc aga aac gac cgc aag agc tac ctc gac gcg
 Ala Tyr Tyr Ile Asp Arg Arg Asn Asp Arg Lys Ser Tyr Leu Asp Ala
 180 185 190

624

tgg tgg tct gtg gtg aat tgg gac ttc gcg aac gag aac ttg aag aag
 Trp Trp Ser Val Val Asn Trp Asp Phe Ala Asn Glu Asn Leu Lys Lys
 195 200 205

675

gca atg cag gga agc gac tag gcgctggtg gtctgtggtg aattgggact
 Ala Met Gln Gly Ser Asp
 210 215

719

(2) INFORMATION FOR SEQ ID NO: 40:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 265 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 40:

TTCCCGGATT TTCAGGCGGA GGCCTGGC GCCGAGCACT TCCGCTTGCA CGAGTACTTG 60
 GGGGACAGCT GGGGAGTGAT GTTCAGGTAA GATTGGCGTA AAAAAGCCCC ATTTAATCGC 120
 ATTTTTAATT CTGTAGACTC TGTGTCGACT GCTGAGCACG AGGGGGGGGC CTGCTGCACG 180
 GGAGAGCCTT GTCTCGCGCT CAACTCTGGG TTTCTGGCGT TGCTTGCAGC CACCCGAACG 240
 ACTTCACCCC CGTCTGCACC ACCGA 265

(2) INFORMATION FOR SEQ ID NO: 41:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 672 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

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(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 41:

atg ccg ttg aac ttg gga gat tcc ttt cca gac ttc cag gcg gag gcg	48
Met Pro Leu Asn Leu Gly Asp Ser Phe Pro Asp Phe Gln Ala Glu Ala	
1 5 10 15	
ctg ggc gcc gag cac ttc cgc ttg cac gag tac ttg ggg gac agc tgg	96
Leu Gly Ala Glu His Phe Arg Leu His Glu Tyr Leu Gly Asp Ser Trp	
20 25 30	
gga gtg atg ttc agc cac ccg aac gac ttc act ccc gtt tgc aca acg	144
Gly Val Met Phe Ser His Pro Asn Asp Phe Thr Pro Val Cys Thr Thr	
35 40 45	
gag ctc gcc gaa gcc gtg aag ctc cag gac tcc ttc acg aag aag aac	192
Glu Leu Ala Glu Ala Val Lys Leu Gln Asp Ser Phe Thr Lys Lys Asn	
50 55 60	
tgc aaa ctc gtt ggc ttc tcc tgc aac gac ctg cag agc cac aga gaa	240
Cys Lys Leu Val Gly Phe Ser Cys Asn Asp Leu Gln Ser His Arg Glu	
65 70 75 80	
tgg gcg aag gat ata atg gcc tat gca ggc cga tct ggg aac ttg ccg	288
Trp Ala Lys Asp Ile Met Ala Tyr Ala Gly Arg Ser Gly Asn Leu Pro	
85 90 95	
ttt ccc ctc gtt tgc gac ccc aat agg gaa ctg gcc gcg agt ttg gga	336
Phe Pro Leu Val Cys Asp Pro Asn Arg Glu Leu Ala Ala Ser Leu Gly	
100 105 110	
att atg gat cct gca gaa aag gac aaa aag ggg ctg cct ttg act tgc	384
Ile Met Asp Pro Ala Glu Lys Asp Lys Lys Gly Leu Pro Leu Thr Cys	
115 120 125	
cgc tgc gtc ttt ttc ata agt cca gag aag aag ctc gcg gcc tct att	432
Arg Cys Val Phe Phe Ile Ser Pro Glu Lys Lys Leu Ala Ala Ser Ile	
130 135 140	
ttg tac ccg gct acc acc ggg aga aac ttc gcg gaa atc ctt agg gtc	480
Leu Tyr Pro Ala Thr Thr Gly Arg Asn Phe Ala Glu Ile Leu Arg Val	
145 150 155 160	
ctg gac tct ctg cag ctc act gcc aag ttt cca gtg gcc act cca gtg	528
Leu Asp Ser Leu Gln Leu Thr Ala Lys Phe Pro Val Ala Thr Pro Val	
165 170 175	
gac tgg acc gct ggg gcc aaa tgc tgc gta gtg ccg aac ttg gca gca	576
Asp Trp Thr Ala Gly Ala Lys Cys Cys Val Val Pro Asn Leu Ala Ala	
180 185 190	
gaa gag gcc caa agg ctt ttg ccc aaa ggc cac gag gcg ctg cag ctg	624
Glu Glu Ala Gln Arg Leu Leu Pro Lys Gly His Glu Ala Leu Gln Leu	
195 200 205	
cct tcg ggg aag cct tac ctg cgg ctc acc cca gac ccc agg ggc tga	672
Pro Ser Gly Lys Pro Tyr Leu Arg Leu Thr Pro Asp Pro Arg Gly	
210 215 220	